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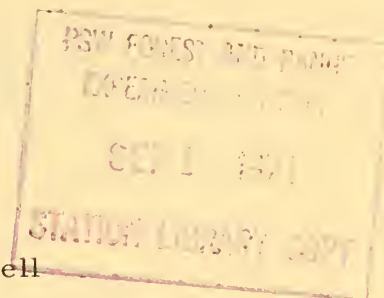
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## CORRELATION BETWEEN DATES OF FLORAL AND VEGETATIVE BUD FLUSH IN DOUGLAS-FIR

by

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### ABSTRACT

*Correlation between dates of floral and vegetative bud flush was nonsignificant for 23 trees. Coefficient of determination was 0.17.*

Keywords: Bud burst, *Pseudotsuga menziesii*.

In studying variability in growth and survival of coast Douglas-fir (*Pseudotsuga menziesii* var. *menziesii* (Mirb.) Franco), considerable attention has been given to its phenology (Munger and Morris 1936; Irgens-Moller 1957, 1967; Morris et al. 1957; Silen 1962). Variation of floral development, particularly in connection with sensitivity to spring frosts, has also been noted. Comparing these observations indicated little or no correlation between dates of floral and vegetative bud burst among trees within a single stand. This note reports the results of a study testing the hypothesis of no correlation.

### MATERIALS AND METHODS

Twenty-three trees growing on a level area on the west side of the Willamette Valley about 10 miles north of Corvallis, Oreg., were

used in the study. The trees were about 25 years old, open grown, and with live crowns extending the lengths of the stems. The observations were made in the spring of 1970.

For bud stage evaluation, five primary branches bearing at least one female floral bud on the most distal secondary twig were chosen and marked. In order to make the observations within the time available, all branches were within 12 feet of the ground and, where possible, were chosen to span the northern half of the lower crown.

Bud stage was observed on *the most distal floral bud* and *the terminal vegetative bud* of each of the five twigs each Tuesday morning and Friday afternoon (that is, each half-week) from the first of March until bud burst was complete. Flushing was considered to have occurred when any green tissue could be seen between the bud scales.

Half-weeks were numbered consecutively from March 10 (the first day flushing was observed on the study trees) as "number 1." Bud burst date for the trees was simply the arithmetic average for the five twigs.

Five observations were available for all trees except one, on which one twig was lost during the course of the observations.

## RESULTS

Floral bud burst started at half-week 1 and was concluded at half-week 6; vegetative bud burst started at half-week 16 and was concluded at half-week 21, except for one bud which did not flush until half-week 23. Mean date of floral bud burst ( $\pm 1$  standard deviation) was  $4.09 \pm 1.36$  half-weeks (March  $20 \pm 4.8$  days). Mean date of vegetative bud flush was  $18.30 \pm 1.41$  half weeks (May  $9 \pm 4.9$  days) or 50 days later.

Correlation coefficient ( $r$ ) between dates of flushing of vegetative and floral buds was 0.411, which just missed significance at 95-percent level of probability. Coefficient of determination ( $r^2$ ) was 0.17, which means that 17 percent of the variation in either vegetative or floral bud burst is attributable to the linear influence of the other variable. The low level of relationship can be seen in the scatter of points in figure 1.

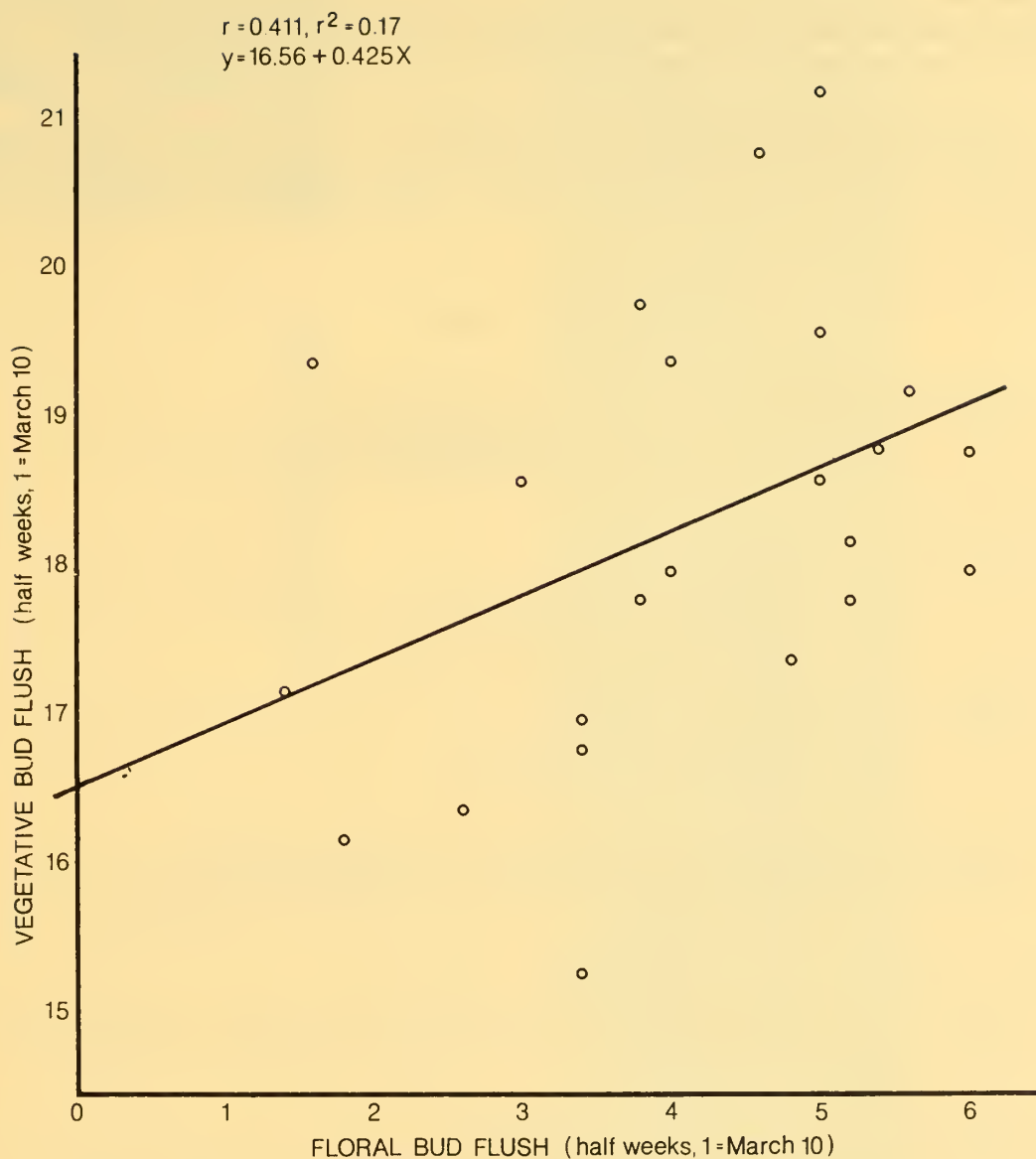


Figure 1.--Correlation between floral and vegetative bud burst date for 23 Willamette Valley Douglas-firs.

### DISCUSSION

Results from this single population sample indicate little relationship between flushing dates of floral and of vegetative buds. This is similar, in a way, to a previously published report on the lack of correlation between date of floral strobilus receptivity and date of cone maturity among individual trees in longleaf pine (*Pinus palustris* Mill.) (McLemore and Derr 1965). Both of these studies

indicate that, although there may be a general underlying mechanism which regulates overall tree phenology to certain climatic events, there still remains much independence in the phenology of the various plant processes. From a practical point of view, this means that as far as rating or ranking trees is concerned, it is not likely to be possible to rank individuals on the basis of phenology of one trait and extrapolate this ranking very accurately to the phenology of other traits.

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